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ABSTRACT

Two From One Casting is a studio course dealing with exploratory applications of casting methods and materials for students in grades 7 through 12 who wish to make permanent those creations easily destroyed by time or negligence. Course rationale, enrollment guidelines, objectives, outline of content, descriptions of activities and procedures, suggestions for the instructor, list of equipment and materials, and a bibliography are outlined in this course guide. Students research the historical applications of casting and relate the research to contemporary products. Student competencies are developed in sand casting, latex model casting, and plastic casting. (KSM)

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AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

DADE COUNTY PUBLIC SCHOOLS

ART EDUCATION

Two From One Casting
6681.20

DIVISION OF INSTRUCTION • 1971

TWO FROM ONE CASTING

NUMBERS:
6681.20
6682.20
6683.21
6687.07

ART EDUCATION

Written by: Anne Hilf
for the
Division of Instruction
Dade County Public Schools
Miami, Florida
1972

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I. COURSE TITLE: Two From One Casting

II. COURSE NUMBERS

6681.20
6682.20
6683.21
6687.07

III. COURSE DESCRIPTION

Exploratory applications of casting methods and materials, from the simplest casting procedures to the more intricate techniques. A studio course.

IV. RATIONALE

Casting can make permanent those creations easily destroyed by time or negligence.

V. COURSE ENROLLMENT GUIDELINES

A. Grades 7-12

B. No prerequisite for this course

VI. COURSE OF STUDY OBJECTIVES

A. Competencies expected of the student. The student will be able to do the following:

1. Research the historical applications of casting and relate the research to contemporary products.

2. Visually present his competencies; the evaluation criteria having been previously determined by his instructor and himself, in the following areas
   a. Sand casting
      1) Plaster
      2) Wax
      3) Aluminum
   b. Latex mold casting
   c. Plastic (clear cast) casting
3. Perform the assigned tasks in the areas within this quin according to the directions and specifications of the tools and materials which are used in the operation of the task

B. Conditions under which the student will demonstrate his competencies
   1. Demonstration
   2. Experimentation
   3. Studio work
   4. Presentation of finished work
   5. Evaluation and critique

C. Description of acceptable performance: student must meet or surpass standards agreed upon by his instructor and himself as outlined in behavioral objectives 1-3 above

VII. COURSE CONTENT

A. Historical and cultural survey

1. The S. Peter attributed to Arnolfo Di Cambio is one of the earliest modern castings in bronze on a large scale

2. During the early 15th century casting as a craft was established in depth by masters like Ghiberti

3. The Baptistery doors were designed and cast in sections during the 13th century. The design of the oldest door, the south, was accomplished by Andrea Pisano and cast in bronze by the Venetian, Leonardo D'Avanzano. The north door was done in the 14th century by Lorenzo Ghiberti with the assistance of Donatello, Paolo Uccello, Bernardo Ciuffagni, and Bernardo Cennini. The east door (The Door of Paradise) is a masterpiece taking 27 years to create and complete by Lorenzo Ghiberti (1425 to 1452)

4. Benvenuto Cellini made his reputation as a goldsmith. The salt cellar of Francis I, cast, chased, and enameled, is his only authenticated work of this nature

B. Casting as a contemporary craft

1. Sculpture
2. Jewelry
3. Functional items
4. Candles
5. Decorative pieces

C. Procedures for casting as an overall approach. Each activity should be presented in a manner that includes:

1. Introduction to the topic
   a. Lecture
   b. Films
   c. Demonstration
   d. Discussion
   e. Student questioning
   f. Presentation of art objects (historical and contemporary)
   g. Experimentation and exploration
2. Establish relevance of topic
   a. Historical
   b. Contemporary (changes and similarities)
3. Students work independently with the instructor as a guide
4. Evaluation by instructor and student

5. Student decides which area in casting procedures he wishes to study and the depth which he devotes to each area of concentration

D. Areas of concentration

1. Sand casting
   a) wax
   b) plaster
2. Investment casting
   a) aluminum
   b) bronze
   c) silver
   d) lead
3. Latex mold casting
   a) wax
   b) plaster
   c) polyester resin
4. Plaster mold casting
   a) plaster
   b) clay
   c) wax
   d) cement

VIII. ACTIVITIES AND PROCEDURES

A. Sand casting

1. From original design carved in sand

a. materials

1) box to contain sand

2) sand (any variety depending on textural effect desired fine or coarse)

3) wax (candle making)

4) wick (cotton)

5) ice pick

6) superfine or finishing plaster

7) cement

8) found objects for textural effects

a) tile

b) shells

c) glass

d) branches

e) drift wood

b. procedures

1) dampen sand slightly to hold shape carved (if too dry will collapse during carving and pouring)

2) plaster - mix plaster (as in general information) and pour directly into sand mold - insert cord or wire hanger as plaster cures

3) wax - heat wax (as in general information) and pour into mold - after wax has set use a heated ice pick to insert wick

4) cement - follow general instructions for mixture and pour directly into the sand mold (sand should be slightly damper for cement pouring)

2. Sand (investment sand) casting from original sculpture

a. styrofoam (fine grain styrofoam) - carve sculpture or functional item from styrofoam

b. sand to smooth surface with finegrain sandpaper (remember any blemish or rough spot will be in the casting)

c. using any metal container with depth (metal can, trash can, etc.) fill approximately 3 to 4 inches with dampened investment sand

d. place styrofoam in sand firmly

e. sift dampened sand over styrofoam piece and ram sand into all crevices of piece - (all open areas should be filled with investment sand)

f. a sprue hole should lead from the mold to the surface of the sand

g. brush all sand away from the sprue hole (this sand can fall into the mold when the molten metal is poured)

h. heat metal used, aluminum or bronze to melting point in crucible and pour gently into sprue hole

i. allow to cool and remove from mold - (with styrofoam the heat of the molten metal will burn away. The expanded plastic and the original from will be replaced by a metallic form)

j. buff down sprue and any other areas that are desired to have a high polish - (most of molds from this procedure will have a relatively rough textural effect)

B. Mold casting - plastic or latex

1. Mold creation (sculpture or relief)

a. oil base clay

b. original plaster or clay sculpture

2. Procedure

a. oil base clay

1) sculpture (in round or relief)

2) latex - rubber mold liquid - requires 6 to 8 heavy coats to create a durable mold

3) allow mold to cure for at least 24 hours

4) remove oil-base clay (original mold may be destroyed during this process)

5) the remaining mold may be used for casting:

a) wax

b) plaster

c) clay

d) polyester resins

b. plaster - follow directions basic for oil base

1) coat with vaseline or mold release

2) finished cast can be sanded and finished with color or a patina finish

IX. SUGGESTIONS FOR INSTRUCTOR

A. Plaster mixing

1. Measure amount of water to fill the mold
2. Plaster mixture should equal approximately 1 quart of water to 4 cups of plaster
3. Add small amounts of plaster until a small amount stays on the surface of the water
4. Stir until thickens
5. Pour into mold
6. Finish with sandpaper or boxwood or carving tools for desired textural effect

B. Wax

1. Break wax into small chunks (wrap in paper and strike with hammer)
2. Use double boiler or equivalent to heat wax (temperature: approximately 210 to 230 Farenheit)
3. Pour wax into mold
4. Wick for candles can be suspended from a rod or inserted later with the use of a heated ice pick

C. Metals

1. Aluminum - low melting temperature - and light weight for sculpture
   a. easy to patina
   b. easy to buff and finish
   c. relatively inexpensive (approximately 35¢ per pound)

2. Bronze
   a. melting point 572° to 1926° Farenheit
   b. an alloy of copper and tin
   c. expense greater than that of aluminum and harder to buff and finish, but warmer in color and more durable

D. Plastics polyester resins

1. Mixture - 4 tablespoons polyester resin to ¼ teaspoon catalyst (the warmer the room the less catalyst needed)

2. Precautions
   a. wear rubber or plastic gloves
   b. well ventilated area in which to work

X. EQUIPMENT AND MATERIALS

A. Oil base clay

B. Plaster

C. Polyester resin

D. Catalyst

E. Clay

F. Wax

G. Wax color and scent

H. Wicking

I. Double boiler or equivalent

J. Cement

K. Sand

L. Investment sand

M. Later rubber

N. Crucible

O. Heat source - gas

P. Aluminum

Q. Bronze

R. Vaseline

S. Mold release

T. Plaster molding tools

U. Boxwood modeling tools

V. Sandpaper (various grades)

W. Buffer with wire and felt belt

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